

CURRICULUM VITAE

PERSONAL DETAILS

Name & Address	Dr. Sang-ki Lee (Assistant Research Scientist) Cooperative Institute for Marine and Atmospheric Studies University of Miami 4600 Rickenbacker Causeway Miami, FL 33149 USA
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EDUCATION & QUALIFICATIONS

Doctor of Philosophy	Oceanography (Dec/1995) Old Dominion University, Norfolk, Va, USA Seasonal Variability of Heat and Mass Transport Processes in the Upper Tropical Atlantic Ocean: A Numerical Model Study Committee: Gabe Csanady (chair), Chet Grosch, Denny Kirwan, Paul Schopf
Master of Science	Oceanography (Dec/1993) Old Dominion University, Norfolk, Va, USA Instability Waves in the Gulf Stream Front and its Thermocline Layer Committee: Gabe Csanady, Chet Grosch, Denny Kirwan, John Adam
Bachelor of Science	Oceanography (Feb/1991) Inha University, Incheon, Korea

PUBLICATIONS (Peer-Reviewed)

1. Lee, S.-K. and C. Wang, 2006: Tropical Atlantic decadal oscillation and its impact on the equatorial atmosphere-ocean dynamics: A simple model study. Journal of Physical Oceanography (revised).
2. Lee, S.-K., D.B. Enfield, C. Wang, 2006: What drives seasonal onset and decay of the Western Hemisphere Warm Pool? Journal of Climate (revised).

3.	Wang, C., D.B. Enfield, S.-K. Lee, C. W. Landsea, 2006: Influences of Atlantic Warm Pool on western hemisphere summer rainfall and Atlantic Hurricanes. <i>Journal of Climate</i> (in press).
4.	Enfield, D.B., S.-K. Lee, C. Wang, 2006. How are large Western Hemisphere Warm Pools formed?. <i>Progress in Oceanography</i> (in press).
5.	Lee, S.-K., D.B. Enfield,, and C. Wang, 2005: Ocean general circulation model sensitivity experiments on the annual cycle of Western Hemisphere Warm Pool. <i>Journal of Geophysical Research</i> , 110, C09004, doi:10.1029/2004JC002640
6.	Enfield, D. B., and S.-K. Lee, 2004. The Heat Balance of the Western Hemisphere Warm Pool. <i>Journal of Climate</i> . Vol. 18, 2,662-2,681.
7.	Thacker, C. W., S.-K. Lee and G. R. Halliwell Jr., 2004. Assimilating 20 years of Atlantic XBT Data into HYCOM: A First Look. Vol. 7, No. 2, 183-210, <i>Ocean modelling</i> .
8.	Lee, S.-K., J. L. Pelegri and J. Kroll, 2001. Slope Control in Western Boundary Currents. <i>Journal of Physical Oceanography</i> , Vol. 31, No. 11, 3,349-3,360.
9.	Lee, S.-K., 2001. On the Structure of Supercritical Western Boundary Currents. <i>Dynamics of Atmospheres and Oceans</i> , Vol. 33, 303-319.
10.	Lee, S.-K., and G. T. Csanady, 1999. Warm Water Formation and Escape in the Upper Tropical Atlantic Ocean: Part I. A Literature Review. <i>Journal of Geophysical Research</i> , Vol. 104, No. c12, 29,561-29,571.
11.	Lee, S.-K., and G. T. Csanady, 1999. Warm Water Formation and Escape in the Upper Tropical Atlantic Ocean: Part II. A Numerical Model Study. <i>Journal of Geophysical Research</i> , Vol. 104, No. c12, 29573-29590.
12.	Lee, S.-K., 1999. Self-excited Variability of the East Korean Warm Current: A Quasi-Geostrophic Model Study. <i>Journal of Korean Society of Oceanography</i> , Vol. 34, No. 1, 1-21.
13.	Lee, S.-K., and G. T. Csanady, 1994. Instability Waves in the Gulf Stream Front and its Thermocline Layer. <i>Journal of Marine Research</i> , Vol. 52, 837-863.

WORKSHOP & INVITED PRESENTATIONS

1. Csanady G.T., A. Kapolnai and S.-K. Lee, Northward Escape of Equatorially formed warm water from the Tropical Atlantic. Atlantic Climate change Program - Principal investigator's meeting, May 2-4, 1995 in Miami, FL.
2. Lee S.-K., Self-Excited Variability of the East Korea Warm Current: A Quasi-Geostrophic Model Study. May 22, 1998, Korea Ocean Research & Development Institute in Ansan, South Korea.
3. Lee S.-K., On the structure of supercritical western boundary currents. The Korean Society of Oceanography Spring Meeting, May 12-13, 2000, Inha University in Incheon, South Korea.
4. Thacker W.C., S.-K. Lee and G.R. Halliwell Jr., Constraining HYCOM: Twenty years of Atlantic XBT data. 6th HYCOM Consortium Meeting – October 7-9, 2002, The Center for Nonlinear Studies at the Los Alamos National Laboratory in Los Alamos, NM.
5. Enfield D.B., S.-K. Lee and C. Wang, Variability and forcing of anomalous Western Hemisphere warm pools, NOAA's 29th Annual Climate Diagnostics and Prediction Workshop October 18-22, 2004 in Madison, WI.
6. Lee S.-K., D.B. Enfield and C. Wang, OGCM study of the interannual variability of Western Hemisphere Warm Pool. NOAA's 29th Annual Climate Diagnostics and Prediction Workshop October 18-22, 2004 in Madison, WI.
7. Lee S.-K., D.B. Enfield and C. Wang, Physics of Western Hemisphere Warm Pool Inferred from an OGCM Simulation: Annual Heat Budget. U.S. CLIVAR Atlantic Science Conference January 31 – February 2, 2005, Rosenstiel School of Marine and Atmospheric Science at the University of Miami in Miami, FL.
8. Lee S.-K., D.B. Enfield and C. Wang, OGCM sensitivity experiments on the annual cycle of Western Hemisphere Warm Pool (WHWP). Layered Ocean Model Users' Workshop January 26-28, 2005, Rosenstiel School of Marine and Atmospheric Science at the University of Miami in Miami, FL.
9. Lee S.-K., and C. Wang, A simple atmosphere-ocean model of tropical Atlantic decadal variability: Interaction between the zonal and meridional modes. October 20, 2005, Atlantic Oceanographic and Meteorological Laboratory (AOML), NOAA in Miami, FL.

10. Lee S.-K., A simple atmosphere-ocean model of tropical Atlantic decadal variability. December 5, 2005, Korea Ocean Research & Development Institute in Ansan, South Korea.

REFEREES (EDITORIAL)

1. Dynamics of Atmosphere and Oceans (DAO)
2. Journal of the Meteorological Society of Japan (JMSJ)
3. Progress in Oceanography – Currently serving as a guest editor for Csanady's commemorative volume.

PAST, CURRENT AND PENDING PROJECTS INVOLVED

1. Atmosphere-ocean processes that control the interannual and decadal variations of the equatorial Atlantic SST (PI: NSF, In Preparation)
2. Clivar mode water dynamic experiment (CoPI: NSF, 2004-2009)
3. Climate impacts of the Western Hemisphere Warm Pool on the Americas (CoPI: NOAA, 2006-2009)
4. Processes that affect the annual and intermediate variations of the western hemisphere warm pools (PostDoc: NOAA, 2004-2006)
5. HYCOM consortium for data assimilative modeling (PostDoc: NOPP, 2002-2003)
6. Air-Sea coupling in the North Atlantic (Ph.D. Student: NOAA, 1994-1995)

WORK EXPERIENCE

Jan/2005 – Present

Assistant Research Scientist: Cooperative Institute for Marine and Atmospheric Studies, University of Miami

1. Climate impacts of the Western Hemisphere Warm Pool: My current research is to explore the impact of western hemisphere warm pool on eastern U.S. summer rainfall, and to understand the factors that cause anomalous warm pools, using the NCAR Atmosphere model (CAM3.1), in collaboration with Dr. David Enfield and Dr. Chunzai Wang.
2. Atlantic subtropical cells and their role in the tropical Atlantic decadal variability: Atmosphere-ocean coupled models of various complexities are used to investigate how ocean dynamics interact with the atmosphere in tropical Atlantic decadal variability. Currently, my research focus is on the interaction between the zonal and meridional modes.

Jan/2001 – Dec/2004

Postdoctoral Research Associate: Cooperative Institute for Marine and Atmospheric Studies, University of Miami

1. Annual cycle of the Western Hemisphere Warm Pool (WHWP): Explored the seasonal heat budget of the WHWP, using Hybrid Coordinate Ocean Circulation Model (HYCOM).
2. Development of data assimilation module for HYCOM: Explored different schemes of (1) initialization, (2) vertical projection of sea surface height data, and (3) estimating companion salinity for XBT profiles to find the best suitable data assimilation schemes for HYCOM. The Atlantic XBT data for 1972-1991 have been assimilated into HYCOM, and the impacts of data on the model were explored in light of available independent observations.

Jan/1996 – Dec/2001

Senior Research Engineer: Maritime Research Institute, Samsung Heavy Industries

1. Warm water formation and escape in the upper tropical Atlantic Ocean: Identified the important role of shear-driven equatorial entrainment and communication with the subtropical ocean in the seasonal heat and mass budget of the upper tropical Atlantic Ocean, using an isopycnal layer numerical model.
2. On the structure of supercritical western boundary currents: Conducted a barotropic quasi-geostrophic numerical model study of the supercritical western boundary currents to generalize their zonal structure with reference to energy production, dissipation and transfer mechanisms.
3. Slope control in western boundary currents: Presented an analytic solution for the steady-state, depth-averaged western boundary current flowing over the continental slope. Identified the important contribution of slope-induced bottom stress torque on the vorticity budget.
Self-excited variability of the East Korea Warm Current, A quasi-geostrophic model study: Developed a multi-layer quasi-geostrophic numerical model to simulate the temporal variability of the East Korea Warm Current. Presented a hypothesis on the possible mechanism of the eddy generation and decay.
4. Large-eddy simulation of turbulent boundary layer effects on stratified fluids in a rotating conical container: Large-eddy simulation was carried out to understand the behavior of arrested Ekman boundary layer under high Reynolds numbers.
5. Engineering works: Prepared technical reports for the construction of offshore oil & gas platforms. These activities involve many different areas of fluid mechanics, such as ocean surface wave, radiation, gas dispersion, fluid-structure interaction, heat conduction & convection, turbulence control, and double diffusion etc.

Jan/1992 - Dec/1995

Graduate Research Assistant: Old Dominion University

1. Developed a multi-layer reduced gravity model, which included a surface mixed layer, to simulate seasonal heat and mass transport in the upper tropical Atlantic Ocean. Atlantic Climate Change Program of NOAA funded this project, through a grant entitled Air-Sea coupling in the North Atlantic (PI: G.T. Csanady).
2. Carried out linear instability calculation to understand the role of frontal instability waves on the interaction of Gulf Stream subsurface waters with the slope waters shoreward of the Gulf Stream front.

Feb/1991-Jul/1991

Graduate Research/Teaching Assistant: Inha University, Incheon, Korea

1. Participated in an effort to modify the General Circulation Model (GCM) of Cox (1984) into a two-layer primitive equation numerical model, which was used to simulate the formation of Ulleung warm eddy in the East/Japan Sea.
2. Taught undergraduate physical oceanography Lab. course.

COMPUTER SKILLS

Operating System: UNIX (LINUX), Mac and MS Window Systems

Languages: FORTRAN, Unix Shell scripts

Graphic & Statistics Software: FERRET, NCL, IDL, S-PLUS(R), Gnuplot

NUMERICAL MODEL EXPERIENCES

1. AGCMs: NCAR Atmosphere model (CCM3 & CAM3); Quasi-equilibrium Tropical Circulation model (QTCM); Planet Simulator (PUMA2)
2. OGCMs: Hybrid Coordinate Ocean Circulation Model (HYCOM), Miami Isopycnal Coordinate Ocean Model (MICOM)
3. CGCMs: Currently developing a regionally coupled model that uses the NCAR Atmosphere model (CCM3) coupled only in the tropical region (30°S – 30°N) with a 3.5-layer reduced gravity ocean model, in collaboration with CDC, NOAA.
4. Homemade models: A multi-layer reduced gravity model; A multi-layer QG model; Gill-type atmosphere model (stand alone version and a version that is coupled with a slab ocean); Gill model coupled with a multi-layer reduced gravity ocean model.
5. Other homemade models: One-dimensional mixing models; 3-D non-hydrostatic LES models.

MEMBERSHIPS

American Geophysical Union
American Meteorological Society
Korean Meteorological Society
Korean Oceanography Society
Oceanography Society of Japan

REFERENCES

Dr. David B. Enfield (supervisor)
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